

Summary of evaluation results

1. Outline of the Project	
Country: Republic of Indonesia	Project title: Project of Research and Education Development of Information and Communication Technology at ITS (PREDICT-ITS)
Sector: Higher Education	Cooperation Scheme: Technical cooperation
Department in Charge: JICA Indonesia Office	Total Cost : 324.0 million yen
Period of Cooperation	April 2006- March 2010
	Partner Country's Implementing Organization: Institute of Technology Sepuluh Nopember (ITS) and Universities in the Eastern part of Indonesia
	Supporting Organization in Japan: Kumamoto University
Other cooperating institutions: Hiroshima Universitiesaga University, Tokyo Institute of Technology, and Tohoku University	
1.1 Background of the Project	
<p>Using lessons learned from the 1997 financial crisis, the Indonesian government defined human capacity building in the science and engineering sectors as one of the critical development strategies needed to enhance the country's competitiveness in domestic industries, including manufacturing. The ICT sector is considered particularly indispensable in responding to ever-advancing engineering innovations in information and communications technology and to sustain stable development. As an island nation, Indonesia's resources tend to be excessively concentrated in Java island. Therefore, capacity development of ICT engineers in the eastern region is a crucial strategy for securing a stable economy and society for Indonesia. Under the National Development Program (PROPENAS) 2000-2004, Indonesia publicized a policy of developing human resources at higher education facilities to boost advancement in its economic, scientific and technological sectors. Further, Jakarta officially announced a presidential decree of Information and Communication Technology Policy in 2001 as a part of its critical policies to enhance the ICT industry and the role of the education sector to foster ICT engineers. Meanwhile, the Directorate General of Higher Education (DGHE) formulated a policy called "Higher Education Strategy on Information and Communication Technology," and in the same year, defined fostering highly-skilled ICT engineers as a key policy. DGHE appointed ITS as a leading university of education and research for the purposes listed above. In the light of this, DGHE requested that Japan provide assistance and cooperation focusing on enhancing capacity in higher education in ICT. In response to this request, a four-year technical cooperation program was implemented starting in April 2006, focusing on enhancing the research capabilities of ITS in the ICT area. The program further aimed to provide highly skilled ICT engineers to industries, universities, and state research institutions in eastern part of Indonesia.</p>	
1.2 Project Overview	
(1) Overall Goal	
The eastern part of Indonesia will have a sufficient level of capabilities of human resource development and research activities in the field of ICT. (The eastern part of Indonesia includes East Jawa.)	
(2) Project Purpose	
ITS strengthens research capabilities in order to provide industries, other universities and government institutes in the eastern part of Indonesia with human resources having the state-of-the-art technologies and skills in the field of ICT.	
(3) Outputs	
Output 1: ITS strengthens research activities and has the international level research capabilities.	
Output 2: ITS transforms the engineering education from classroom-based to laboratory-based.	
Output 3: Academic linkage between ITS and universities in the eastern part of Indonesia is established.	
Output 4: Joint activities between ITS and industries and government institutes are strengthened.	

(4) Inputs

Japanese side (performance at the time of evaluation):

Experts dispatched	38.34MM	Equipment	14.07 million yen
Local Cost	49.78 million yen	Trainees Received	Short-term training: 2 Long-term training: 4

Indonesian side:

Personnel allocation at counterpart	20
Local Cost	2.22 billion Indonesian rupiah (equivalent to 22.24 million yen)
Other (assistance from DGHE)	Funds needed for academic staff in eastern part of Indonesia to study at ITS, competitive research funding, funds to submit papers to international academic society and academic journals, funds to apply for patent registrations, etc.

2. Evaluation Team

Members of Evaluation Team	(1) Team leader/overall management: Kiichi Tomiya, Senior Representative of JICA Indonesia Office (2) Cooperation plan: Nobutaka Tanimoto, JICA Indonesia Office (3) Higher education: Satrio Soemantri, guest professor at Toyohashi University of Technology (4) Higher education: Ryuichiro Shima, Higher Education Policy advisor to DGHE (5) Evaluation plan: Machiko Nunotani, Technical and Higher Education Division, Human Development Department, JICA (6) Evaluation analysis: Kaneyasu Ida, senior consultant, Interworks Co., Ltd.	
Period of Evaluation	July 29, 2009~ August, 14 2009	Type of evaluation: terminal evaluation

3. Result of Evaluation

3.1 Key project outputs

Performance of Project Purpose/benefits are as follows:

(◎: achieved higher than expected, ○: achieved generally as planned, Δ: Delay in planned progress)

Output 1: ITS strengthens research activities and has the international level research capabilities (performance: ◎)

At the start of the project, three to five joint research projects were planned for each batch. As a result, 14 projects were carried out over three batches, through laboratory-based education, video conferences, and training in Japan, hosting international-level conferences, and publishing papers to academic journals. In addition, seven patents are registered as of now, and three more are applied to be registered by the time of project completion, while four patents were to be registered as originally planned. Academic staff at ITS were greatly motivated through participating and achieving outputs in joint research. This contributed to establishing a platform to pursue research and significantly increase the number of applications and winner of competitive research funds. Furthermore, ITS academic staff actively presented papers on the results of their work to outside researchers and shared experiences with them at scientific conferences and seminars.

Output 2: ITS transforms the engineering education from classroom-based to laboratory-based. (performance: ◎)

During the project, a guideline for introducing laboratory-based education was formulated and all pilot laboratories involved. Further, an annual seminar for introducing laboratory-based education was planned and biannual workshops were planned to be held within ITS to introduce laboratory activities. Eventually, four seminars and 23 workshops were held during the project period, on top of additional activities to introduce and disseminate the system to other engineering faculties. As a result, laboratory-based education was adopted by the Dept. of Chemical Science, the Dept. of Marine Engineering, and other faculties. It also became common practice among targeted faculties such as the Dept. of Electrical Engineering and the Dept. of Information Systems.

Output 3: Academic linkage between ITS and universities in the eastern part of Indonesia is established (performance: ○)

The collaboration framework and scheme were enhanced by project implementation. Specifically, a consortium was officially established between ITS and four universities in eastern part of Indonesia (UNSRAT, UNRAM, UNDANA, and UNCEN, hereinafter referred to “EPI universities”). Further, the consortium has established an agreement to collaborate with Kumamoto University. Two administrative and three academic staff were assigned to the ICT Center at ITS. Thanks to this academic collaboration, 26 academic staff from eleven universities/institutions in the target region actually participated in joint research, which exceeded the planned number of 12 academic staff in a year. ITS sent academic staff to member universities in the collaboration to support their academic activities as well as give lectures and presentations at seminars. ITS hosted 43 presentation sessions on their research activities, and universities in eastern Indonesia hosted six seminars in total, even though only one a year was expected. After the project started, DGHE introduced a networking system called “INHERENT”. The project made maximum use of the network to facilitate joint research with EPI universities. This brought the benefit of ITS support for ICT lectures at UNSRAT through remote education. Before the project, research at EPI universities was not active; however, academic collaboration with ITS brought powerful motivation and opportunities for participating in joint research, acquiring degrees, and improving the quality of education in the region.

Output 4: Joint activities between ITS and industries and government institutes are strengthened. (performance: Δ)

Under the project, academic staff published a brochure to introduce their study results with ICT academic staff and launched a website. They also formulated a database in collaboration with an institute called Research & Community Service Org. (LPPM). Further, they compiled a research catalogue to disseminate the results of their joint research. These materials were used to advertise their research activities to business sectors thorough seminars, open campus events, and exhibitions. The project also promoted their activities among individual businesses, targeting companies affiliated with Japan. So far, they have established a cooperation agreement with three companies to promote technical cooperation. It was expected that they would establish a joint research scheme with more than half of the joint research projects as a whole; however, only two out of fourteen projects were established with the business sector. At the beginning of the project, it was expected that five venture firms would be established, but none of them have been set up as of yet.

Project Purpose: ITS strengthens research capabilities in order to provide industries, other universities and government institutes in the eastern part of Indonesia with human resources having the state-of-the-art technologies and skills in the field of ICT.

(Expected performance: ○)

As a result of joint research, a total of 43 papers were presented or published to international academies and journals. Also, academic staff from 18 universities and polytechnic schools in eastern part of Indonesia participated in the joint research, which exceed the expected number of ten institutions. In addition to universities, five corporations and state institutions participated in the joint research and in university-industry linkages. This greatly contributed to enhancing the research capabilities of ITS academic staff, allowing academic staff at EPI universities to take postgraduate ITS courses and participate in joint research stemming from laboratory-based education.

Overall Goal: The eastern part of Indonesia will have a sufficient level of capabilities of human resource development and research activities in the field of ICT. (The eastern part of Indonesia includes East Jawa.)

By strengthening the collaboration between the EPI universities and ITS, a platform to provide education and research can be steadily formulated. On the other hand, it is necessary to address individual issues (e.g. infrastructure facilities) that each EPI university is facing. The Overall Goals can be achieved by maintaining collaborative schemes between EPI universities and ITS as well as through the enhanced collaboration between Japanese universities that was established as a result of this project.

3.2 Outline of Five Evaluation criteria

(1) Relevance

Evaluation result: Relevance is very high.

ITS is considered a key EPI university. This project endeavors to enhance the capacity of EPI universities by improving research capabilities at ITS. This is consistent with DGHE's policies and therefore relevance is very high. DGHE provided additional support according to Project Outputs; for example, increasing the allocation of budget, providing scholarships to EPI universities and allowing them access to competitive research funds. In addition, EPI universities have a strong need for support from ITS. Since the Outputs achieved in the ICT sector can be widely used in other fields of study, the selection of the ICT sector was also relevant.

(2) Effectiveness

Evaluation result: Effectiveness is very high in joint research, laboratory-based education, and collaboration between ITS and EPI universities. Future development is expected to bring benefits in terms of collaboration between universities and industries.

To achieve the project objectives, it is important that project activities ensure a circulation of personnel with advanced skills at EPI universities, as well as enhancing the research capabilities of ITS as a core university. This project contributed to boosting the educational capabilities of EPI universities through implementation of joint research within ITS (with the assistance of Japanese universities), establishing laboratory-based education, encouraging human exchange and collaboration among EPI universities (including academic staff temporarily studying at ITS), and disseminating a remote education system. The project also significantly contributed to setting up an environment that promotes collaboration between industries and universities in ways such as strengthening staff allocation at the ICT Center, creating materials to promote research activities conducted in ITS, applying patents, and fostering collaborative relationships with individual business); however, a four-year period was not enough to widely promote their enhanced research capabilities and performance of joint research with the industrial sector.

(3) Efficiency

Evaluation result: Efficiency is very high.

Though it was difficult to dispatch Japanese experts for long periods of time, introducing a remote education system enabled effective and smooth communication between ITS academic staff and Japanese experts. This project stressed on between ITS and EPI universities, which was further enhanced by external government support—such as the scholarship and research funds provided to EPI universities by DGHE and INHERENT.

(4) Impact

Evaluation result: Projected impact is very high, and no significant negative impact is expected

Although the project is still ongoing, some positive impacts have already been demonstrated. Specifically, new laboratories have been established through joint research, collaboration among other faculties through ICT has been established, and laboratory-based education has spread to other faculties. In addition, the project brought benefits beyond the scope of existing projects; for example, a MOU was established between ITS and EPI/overseas universities. Moreover, since some academic staff from EPI universities have studied at ITS to acquire higher degrees and improve their research capabilities, (actually, most of the graduate students at ITS are from EPI universities), the research capacity and quality of education at EPI universities can be further improved over the years if assistance by DGHE and ITS can be continued even after project completion.

(5) Sustainability

Evaluation result: Sustainability is very high in ITS, and relatively high in EPI universities

Policy aspect:

Since ITS was defined as a core university to foster highly advanced ICT engineers in eastern part of Indonesia, it is expected that ITS will be able to obtain assistance from DGHE in a continued manner over the long term to receive academic staff from and implement joint research with EPI universities. Further, using the academic communication network, INHERENT, can establish collaborative relationships between not only EPI universities but also all universities and research institutions in Indonesia at relatively low cost.

Organization/financial aspect:

Laboratories in ITS have increased the number of applications and acquisition of various competitive funds provided by DGHE, hoping to secure self-sustainable funds even after project completion. Further, since laboratory-based education has been defined as a mid-term ITS objective and adopted as part of the curriculum, laboratory systems can be stably maintained in the future. Furthermore, a MOU was established between EPI universities and ITS, bringing further benefits in terms of human exchange through education and research at ITS, EPI universities, and educational institutions even after completion of the project.

Technical aspect:

Through this project, more than half of the total 14 pilot laboratories were able to register patent applications, and there is also the hope that collaborative relationships with the outside world (e.g. industries) would be expected even after project completion.

In the meantime, EPI universities still face difficulties in sustaining and developing their research capacity on their own, due to a lack of personnel that can apply for competitive funds as well as insufficient curricula for postgraduate programs, facilities, and laboratory equipment. Therefore, it depends on whether EPI universities can maintain collaboration for joint research and degree acquisition with maximum use of INHERENT and other cooperative frameworks for academic collaboration with ITS.

It seems that collaboration between universities and industries can further be enhanced by continuous efforts by ITS in terms of accumulating research achievements, attaining satisfactory research results and outputs (e.g. patents), and strengthening its organizational structure.

3.3 Factors that promoted realization of effects

(1) Factors concerning to Planning

- The four outputs of the project were designed to be linked each other through joint research activities. This facilitated an understanding of purpose, direction and action plans among those who are involved in the project, thereby ensuring effective input.

(2) Factors concerning to the Implementation Process

- With regard to the Project purpose of “enhancing research capacity at ITS”, major outputs were brought by technical transfer through joint research with Japanese universities. Further, more elaborate research outputs were observed through presentations at international academic conferences, posting articles in academic journals, and patent applications which aim for industrial linkages.

- For successful and smooth introduction of laboratory-based education at pilot laboratories, academic staff in ITS exercised their strong initiative to encourage the involvement of the students to their laboratory activities. Also, such successful methods for introducing laboratory-based education as joint research and patent applications were widely shared with other academic staff, by means of internal seminars and the formulation of research guidelines.

3.4 Factors raising problems and issues

(1) Factors concerning to Planning

N/A

(2) Factors concerning to the Implementation Process

Though the project aimed to enhance industrial linkages in ways like joint research and establishment of venture companies within ITS, these initiatives have yet to succeed, since the majority of businesses in the eastern part of Indonesia do not have research and development facilities. Collaboration with the local industries appears difficult at the moment.

3.5 Conclusion

This project is highly relevant with government policy, and enjoys strong endorsement from EPI universities. ITS increased its capacity to carry out world-class research and establish a scheme for academic collaboration with EPI universities. Maintaining and enhancing these relationships can greatly contribute to improvements in research capacity and the quality of academic staff at EPI universities. ITS is ambitious in its efforts to maintain collaborative relationships with EPI universities and to conduct joint research through laboratory-based education. Therefore, the sustainability of this project after completion is expected to be high. At the same time, further efforts must be made to establish strategic and specific collaboration between industries and universities.

3.6 Recommendations

Recommendations for DGHE

- To continue providing assistance to ITS and EPI universities after project completion
- To improve INHERENT (intercollegiate information communication network) for stable use

Recommendations for the project /ITS

(Joint research)

- To promote joint research and human exchange (both academic staff and students) with Japanese universities by utilizing MOU
- To actively apply for competitive research funds provided by DGHE and other organizations
- To provide continuous support for patent applications

(Collaboration with other EPI universities)

- To consider measures for further enhancement of cooperative framework with EPI universities, especially in joint research
- To support EPI universities' capacity development in terms of writing proposals to obtain competitive research funds, which can be used not only for research but also for improvement of facilities and infrastructure.
- To formulate follow-up mechanisms, such as creating a mailing list and an alumni association for those who (especially the academic staff of EPI universities) participated in joint research or graduated from ITS, so that their research activities are maintained and further developed.

(Laboratory-based education)

- To certify laboratories that have introduced laboratory-based education and spread the system to other faculties by reporting their experience and performance
- To formulate a model for introducing the system of Laboratory-based education to EPI universities
- To create opportunities for exchanging experiences with other universities

(Collaboration with industries and universities)

- To strengthen the function of ICT Center/LPPM with concrete strategies for personnel and budget allocation
- ICT Center/LPPM to create strategies and a roadmap for collaboration between universities and industries
- ICT Center/LPPM to collaborate with external partners (such as a consultant firm)
- ICT Center/LPPM to assign personnel with a business background/know-how
- ICT Center/LPPM to provide training for their employees on marketing and business culture
- ICT Center/LPPM to continuously update the research catalogue to promote their research outputs to the industries
- ICT Center/LPPM to study good practices of collaboration among universities and industries

3.7 Lessons Learned

Lessons learned from this project are as follows:

- As a result of external activities such as presenting at international academic conferences, patent applications, and conducting joint research with Japanese universities, the motivation of the counterpart personnel was highly enhanced, which contributed to the production of enhanced research outputs.
- Since counterpart personnel at ITS worked hard to introduce their laboratories to the students, formulate research guidelines, and present their research outputs, the laboratory-based education system was smoothly introduced in all 14 pilot laboratories. At the same time, project activities and results were gradually spread to other faculties in ITS that were not targeted by this project.
- Collaboration with EPI universities was promoted because: (1) ITS was assigned as a leading university in the ICT field in the eastern part of Indonesia, (2) DGHE supported ITS and EPI universities covering the costs necessary for capacity building, and (3) ITS effectively utilized the INHERENT networking system to communicate with EPI universities. In the meantime, since INHERENT has yet to create a stable communication environment, the Indonesian government is expected to take the initiative in improving and reforming it into a more stable information communication network in the coming years.

Since a large number of businesses located in the eastern part of Indonesia have their head office functions in Jakarta and Singapore, there have been few opportunities to request ITS investigations or conduct joint research so far. However, collaboration with the private companies in Australia and the US can be expected

if communication channels are expanded globally by presenting research outputs at international academic conferences and in academic journals, acquiring patents, and compiling databases which enable to access to their research results online.